SERVICE MANUAL

MODEL SNX-300

----- Notice in repairing -----

Dismantle the equipment, after separating power completely.

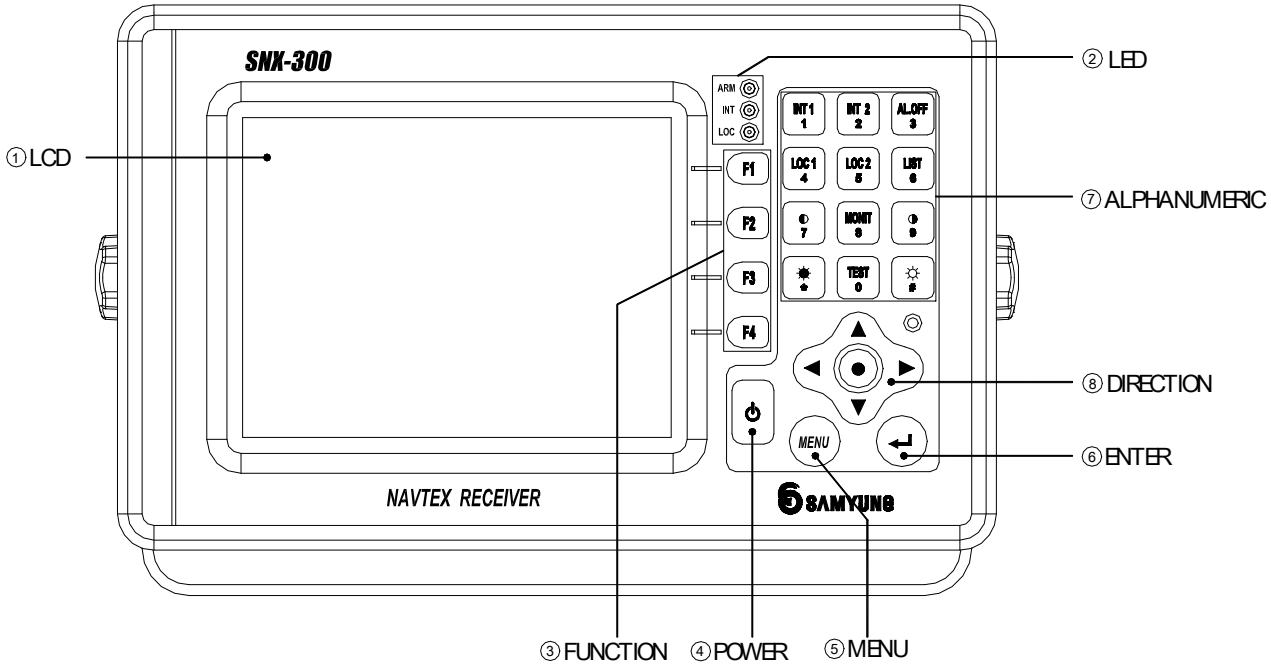
At first understand the problems of equipment.

Use insulated tools in adjusting in order to prevent the short of circuit or electronic part.

Smoothly adjust in adjusting parts, such as Variable Resistor.

Do not turn on long time, if there are defects in products.

Understand this manual completely before doing repairs or tests.



NO	ITEM	DESCRIPTION
①	LCD	DISPLAY RX MESSAGE & VARIOUS INFORMATION
②	LED	BLINKING, ACCORDINT TO STATUS
③	FUNCTION	FUNCTION BUTTON, LINKED TO LCD
④	POWER	POWER ON/OFF
⑤	MENU	MENU BUTTON
⑥	ENTER	ENTER BUTTON
⑦	ALPHANUMERIC	NUMBER & ALPHABET / SHORT KEY
⑧	DIRECTION	DIRECTION BUTTON

1. Specification

1-1 RECEIVER

- Receiving Frequency : 518KHz , 490KHz or 4209.5KHz
- Receiving Modulation : F1B (NBDP)
- Sensitivity : 2uV e. m. f. (50 ohms), 4% error rate or less
- Antenna input : 50 ohms for NAVTEX Active antenna

1-2 DISPLAY SECTION

- Type of display : 5.7-inch LCD, 320×240 dots
- Back-light : For LCD and key board
- Dimmer control : 10 level adjusting (Selectable from keyboard)
- Contrast control : 10 level adjusting (Selectable from keyboard)

1-3 POWER SUPPLY

- Input voltage : Regular voltage DC 12/24V (10 ~36V)
- Power consumption : 10 W (at 24 V dc input)

1-4 ACTIVE ANTENNA (SAN-300)

- Receiving frequency : 518kHz, 490kHz and 4209.5kHz
- Consumption current : 8Vdc 10mA (Typ.)
- Impedance : 50 ohms

1-5 ENVIROMMENT

- Operation temperature : -15°C to +55°C
- Storage temperature : -25°C to +75°C
- Relative humidity : 95% at 40°C (without dew condensation)
- Vibration : IEC 60945

2. CIRCUIT DESCRIPTION

2-1 PORT DESCRIPTION

1. **AF_SEL** = WHEN U16/B, U16/C TURN ON, “H” CHANGES AF SIGNAL TO OUTER CONNECTOR PIN NO. 8 & NO. 9.
2. **BUZZER-H** = SENDING ALARM SIGNAL TO THE OUTSIDE.
3. **DOT1** = SENDING DOT SIGNAL, RECEIVED INTERNATIONAL BROADCASTING, TO CPU. (518KHz)
4. **DOT2** = SENDING DOT SIGNAL, RECEIVED DOMESTIC BROADCASTING, TO CPU. (490KHz,4.2095MHz)
5. **RX1_TEST** = SELECTING 518KHz, IT BECOMES“H”. U14/A GETS TURNED ON.
6. **RX2_TEST** = SELECTING 490KHz, IT BECOMES “H”. U14/B GETS TURNED ON.
7. **TEST_SEL** = IN TEST, IT BECOMES “H”, SUPPLIES T5V. (T5V TURNS ON MIXER & RELAY FOR TEST.)
8. **TEST_FSK** = IN TEST, CPU SENDS FSK SIGNAL OF 1.7KHz±85Hz TO MIXER(U17).
9. **ANT_TEST** = NORMALLY IT BECOMES “L”. IN CASE OF ANTENNA SHORTAGE, IT BECOMES “H”.
10. **DOT2_SEL** = IN“H”, DOT2_9V IS SUPPLIED. ON DOMESTIC BROADCASTING, 4.2095MHz IS SELECTED.
11. IN “L”, /DOT2_9V IS SUPPLIED. ON DOMESTIC BROADCASTING, 490KHz IS SELECTED.

2-2 RECEIVER

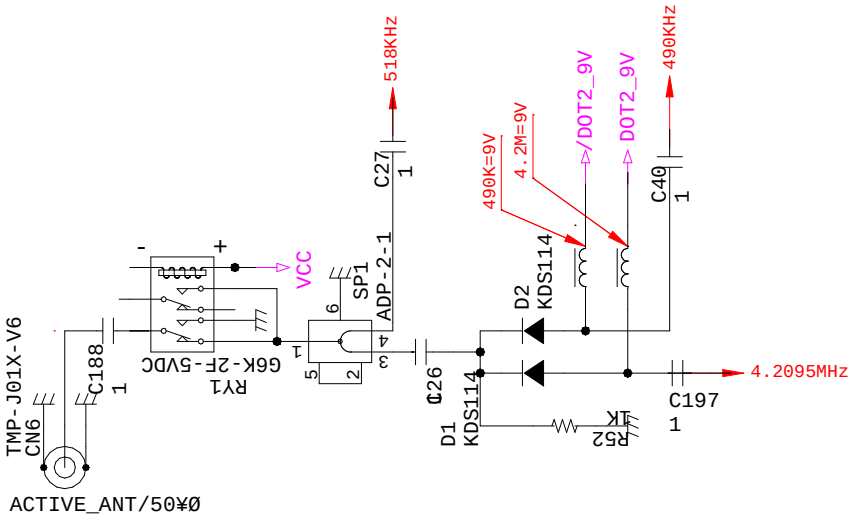
2-2-1 Receiving frequency switching

Signal, input to antenna is divided to two signals through sprit(SP1).

International frequency is input to the filter of next step. Domestic frequency, another signal, divided from sprit(SP1), is selected as 490KHz & 4.2095MHz by selected diodes D1 & D2,

If DC9V(/DOT_9V) is added to D2, D2 turns ON, selects 490KHz.

If DC9V(DOT_9V) is added to D1, D1 turns ON, selects 4.2095MHz.



2-2-2 518KHz Receiving circuit

Signal, divided from sprit(SP1), does band path filter & amplification through T2-T3-Q14-T1-FL1-Q1. It enters into mixer(U2), gets mixed with 516.3KHz, created at U10 & creates AF signal, 1.7KHz.

AF signal passes 1.7KHz audio band path filter(U3) & gets amplified(Q12), after removing unnecessary signal.

Amplified audio signal is input to demodulation IC(U20:NJM2211M), enters into CPU, demodulated as DOT signal.

2-2-3 490KHz receiving circuit

Another signal, divided from sprit(SP1) selects 490KHz & 4.2095MHz, according to selective diode D1 & D2.

If DS9V is added to L4, D2 turns On, selects 490KHz. It does band path filter & amplification through T5-T6-Q3-T4-FL2-Q7. It enters into mixer(U6), gets mixed with 488.3KHz, created at U11 & creates AF signal, 1.7KHz.

AF signal passes 1.7KHz audio band path filter (U7) & gets amplified(Q13), after removing unnecessary signal.

Amplified audio signal is input to demodulation IC(U19:NJM2211M), enters into CPU, demodulated as DOT signal.

2-2-4 490KH & 4.2095MHz receiving circuit

Another signal, divided from sprit(SP1) selects 490KHz & 4.2095MHz, according to selective diode D1 & D2.

If DS9V is added to L5, D1 turns On, selects 4.2095MHz. It does band path filter & amplification through T8-T9-Q6-T7. It enters into mixer(U5), gets mixed with 3.7195MHz, created at U23, U9 & creates 490KHz. This does band path filter & amplification through FL2-Q7. It enters into mixer(U6), gets mixed with 488.3kHz, created at U11 & creates AF signal, 1.7KHz. AF signal passes 1.7KHz audio band path filter (U7) & gets amplified (Q13), after removing unnecessary signal.

Amplified audio signal is input to demodulation IC (U19:NJM2211M), enters into CPU, demodulated as DOT signal.

2-2-5 demodulation circuit

RF RECEIVER TEST

1) In case of 518KHz TEST, RX1_TEST becomes “H”, U14/A turns ON. 516.3KHz is supplied to mixer (U17) by DOT2_SEL signal (“L”). 518KHz±85Hz, mixed with FSK signal of 1.7KHz±85Hz enters into switched relay(RY1). So, we can check RECEIVER & DUTY ration.
2) In case of 490KHz TEST, RX2_TEST becomes “H”, U14/B turns ON. 488.3KHz is supplied to mixer (U17) by DOT2_SEL signal (“L”). 490KHz±85Hz, mixed with FSK signal of 1.7KHz±85Hz enters into switched relay(RY1). So, we can check RECEIVER & DUTY ration.
3) In case of 4.2095MHz TEST, RX2_TEST becomes “H”, U14/B turns ON. 488.3KHz is supplied to mixer (U18) by DOT2_SEL signal (H). 4.2095MHz±85Hz, mixed with FSK signal of 1.7KHz±85Hz, mixed(U18) with 3.7195MHz by adding T5, enters into switched relay(RY1). So, we can check RECEIVER & DUTY ration.

antenna TEST

If antenna terminal gets short, DC1.6V is supplied to U4/A. Voltage gets lower than basic voltage 2.1V. ANT_TEST terminal becomes 5V, which informs users that there are problems in antenna. Normal status becomes about 3.5V, higher than basic voltage 2.1V. It becomes 0V, which informs to CPU that there is no problem.

3. Error check description

3-1 System self check (MENU→ 6key)

3-2 If power of NAVTEX is not turned on

Link power cable & check if LED1 of N-727 PCB is ON.

In case of OFF : Check the severance of fuse, power cable, reverse wire linking(red wire is linked to "+"terminal, black wire is linked to "-"terminal), crushing, short circuit, power source grounding, etc.

In case of ON

- **If LED2 & LED3 are OFF** : input voltage should be DC 12V/24V(+30%, -10%).

Check the circuits around U4, U23, U14 of N-727PCB & change the circuits.

Check if ON switch of N-728(KEY)PCB is working. (If No. 3 pin of U14 is not changed from "H" to "L", when you press ON-SW, check N-728PCB & cable.)

- **If LED2 & LED3 are ON** : In case of no screen showing, at first, check -25V of No. 4 pin of U3 of N-727PCB.

→ Check circuits around U8

When -25V comes out, check if -20V(±2V) comes out from TP2(Vo). If -20V(±2V) does not come out, check circuits around U3 & change the LCD.

3-3 In case of NAVTEX's sensitivity problem

1.Check antenna.
2.Check the severance of antenna cable.
3.Electronic noise in engine may be affecting NAVTEX.
4.Change the route of power cable from engine.
5.Add noise suppressor to power cable.
6.Use protective ignition plug wire, or .A.C. generator noise suppressing filter.

3-4 In case of printer problem

1.It may be printer cable problem. Or printer setup may be incorrect.
2.Check if printer cable is correctly linked physically.
3.Check the polarity of printer cable.
4.If possible, check the baud rate setting of printer.

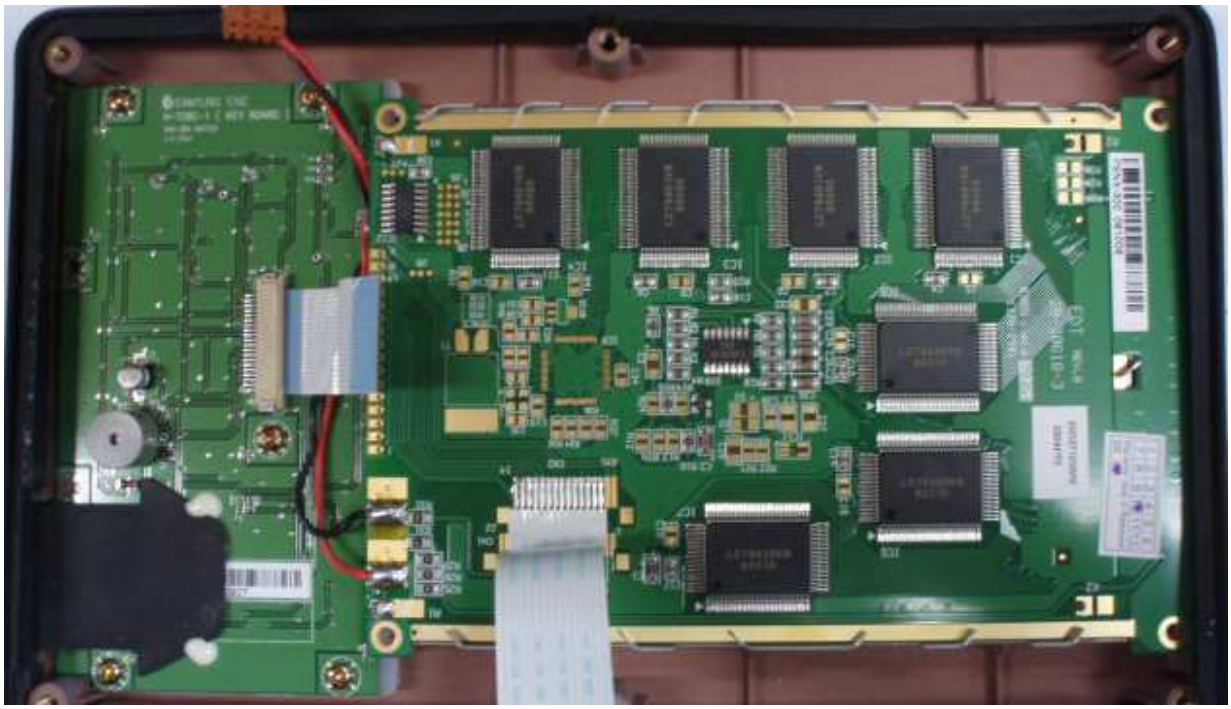
4. Photo of equipment

4-1 Front side

4-2 Back side

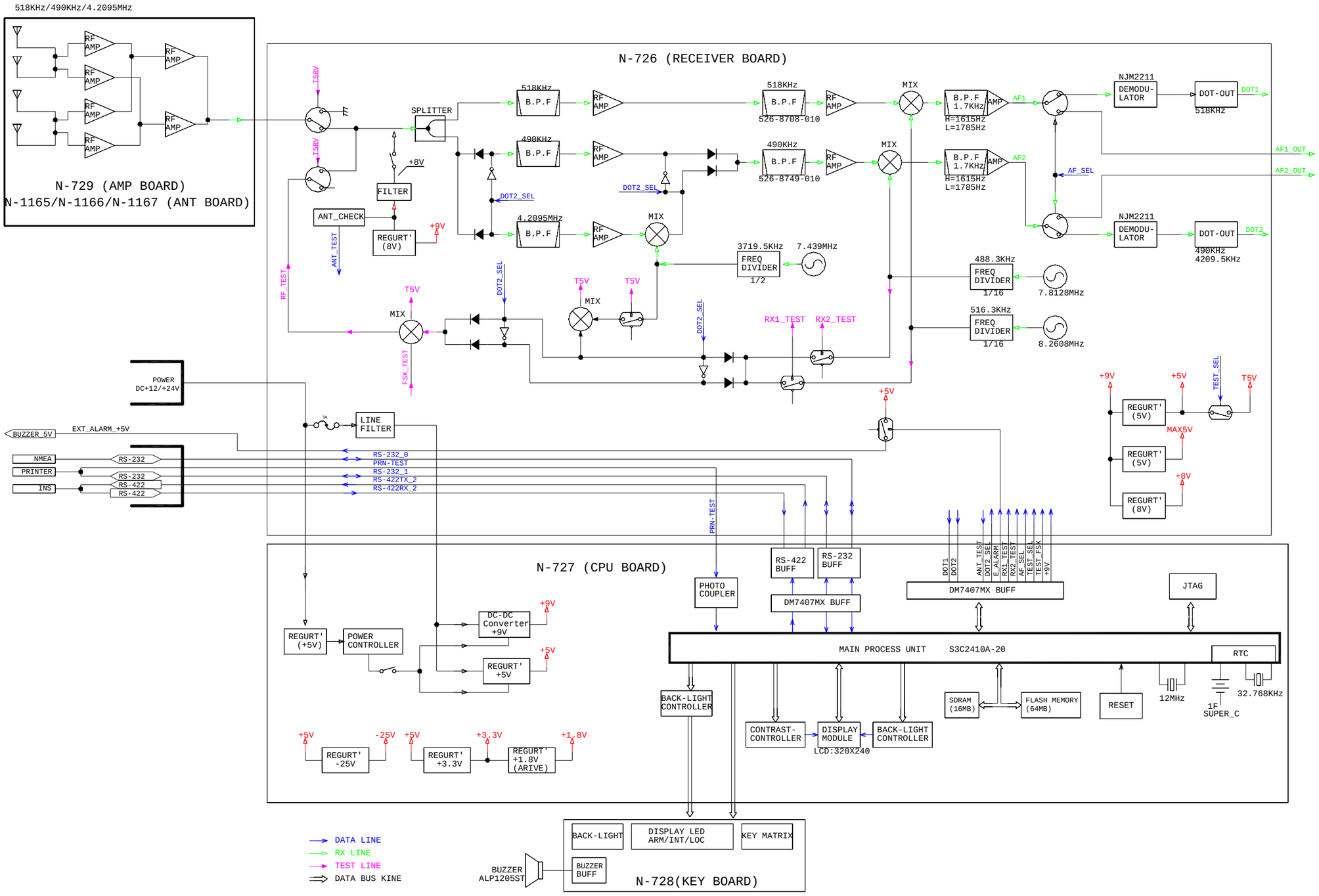
4-3 CPU

4-4 LCD KEY

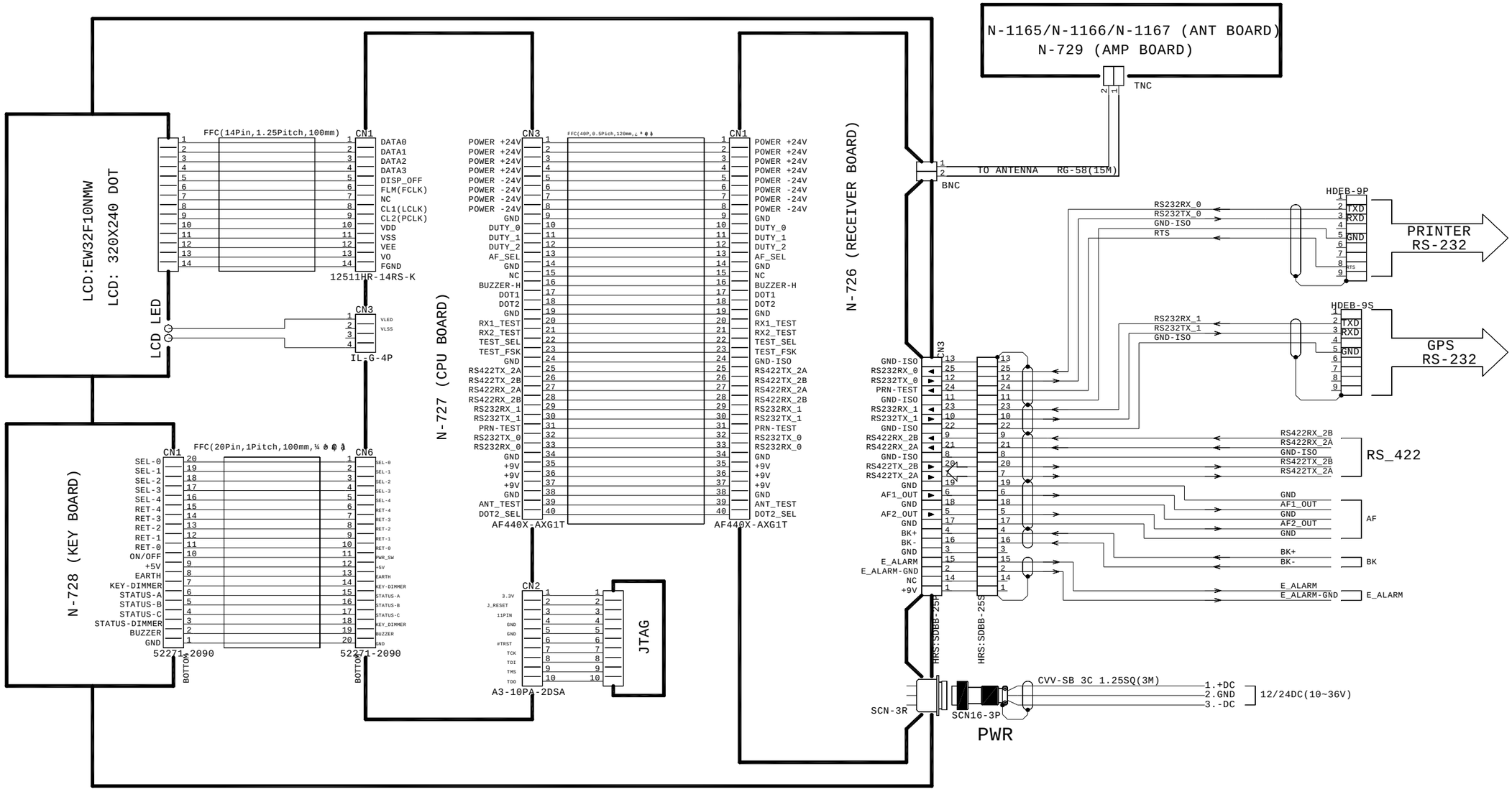


4-4 RF

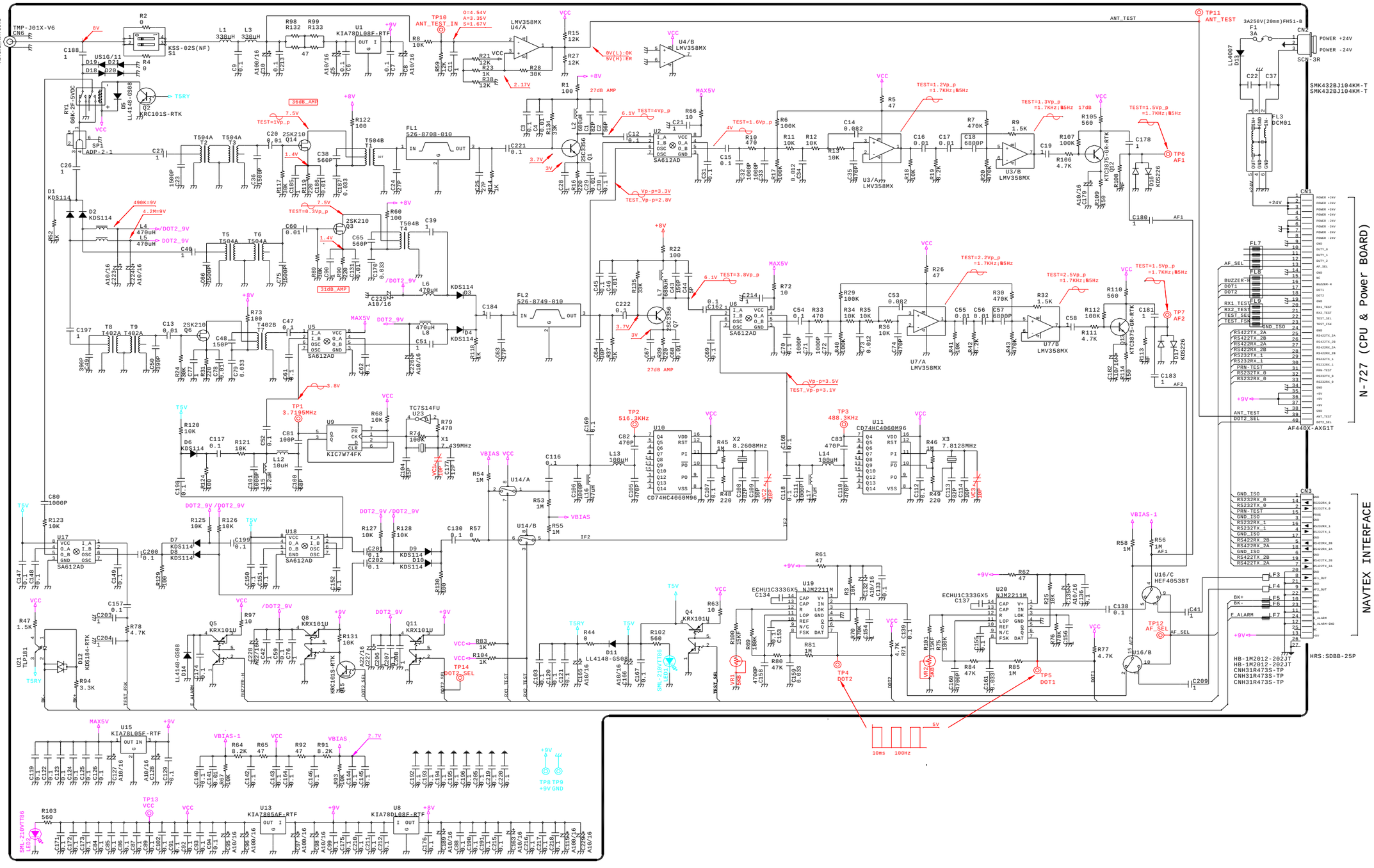
5 BLOCK DIAGRAM



6 WIRE DIAGRAM



7 VOLTAGE DIAGRAM N-728



8 CPU DIAGRAM N-727